The Laurentian Great Lakes represent the largest freshwater ecosystem on Earth and supports countless human populations and their economies (Rau et al., n.d.). Of particular concern are the commercial fisheries that have been in decline since the 1940s, which has been attributed to overfishing, invasive species, chemical pollution, and declining nutrient levels (Hudson & Ziegler, 2014). Much of what we know about nutrients levels and cycling in The Great Lakes is limited to spring and summer, with few *in situ* Great Lakes studies representing winter processes (Pu et al., 2025). This is largely attributed to traditional limnological views that labeled winter as a time of inconsequential biological activity, therefore being of little importance to annual and intraseasonal lake processes(Hampton et al., 2015; Powers & Hampton, 2016; Salonen et al., 2009). Most importantly, and perhaps the underlying reason for traditional limnological views is the logistical difficulty in winter sampling, which is impeded by hazardous conditions, expensive equipment, and a field sampling period that is concurrent with academic calendars (Block et al., 2019; Bolsenga et al., 1988). Recent work has brought to light the vital role that winter ecological and biogeochemical processes play in year round conditions, with impacts that are felt in the subsequent spring and summer (Hampton et al., 2017; Özkundakci et al., 2016; Sommer et al., 2012; Wen et al., 2020). Changing winter conditions can upset normal lake processes and can have cascading effects on ecological and biogeochemical processes that can in turn threaten the Great Lakes’ water quality and health of biological communities (Hampton et al., 2017). One such variable, ice cover, is notoriously variable between years and among lakes (Fujisaki et al., 2012; *Simulating Impacts of Precipitation on Ice Cover and Surface Water Temperature Across Large Lakes - Fujisaki-Manome - 2020 - Journal of Geophysical Research: Oceans - Wiley Online Library*, n.d.), and However, much work is yet to be done and the more we can devote to understanding how winter is an integral component of annual limnological processes, the better we will be able to apply effective measures to managing The Great Lakes and its resources like commercial fisheries.

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